High Tunnels: Are they Lucrative?

Blue Gate Farm offers its data

Sally Worley

December 2008 spinach growing in Blue Gate's tunnel.

Fruit and vegetable farmers are often lured by the prospect of increasing their revenue by adding a high tunnel. These structures provide the opportunity to make money outside of the regular growing season, making it more feasible to create an income solely on the farm as well as taking some of the income pressure off of the main season when many farmers work inhumane hours. However, it costs money to construct a high tunnel. How much income do you have to create via your high tunnel to cover the expenses and make some money?

High tunnels, also called hoophouses or passive solar greenhouses, are unheated greenhouses that allow crops to grow outside of the normal season. High tunnels also provide a protected environment during the main season for sensitive crops that are difficult to grow outdoors.

As part of a PFI Cooperator project Jill Beebout and Sean Skeehan of Blue Gate Farm near Chariton shared their fall 2008 records with PFI. Is their investment paying off? The results indicate that it will.

Jill and Sean operate a community supported agriculture (CSA) program that goes out to 30 families. They also sell their products at the Des Moines farmer's market. Their products include vegetables, honey, free range eggs, and preserves made fresh on the farm.

Results for the Fall 2008 Season

Blue Gate Farm is home to a 26 feet wide, 48 feet long, and 12 feet tall high tunnel including double layer 6 mil plastic, with inflation between layers, and late season use of low row covers over individual beds. All of the following were planted on September 5, 2008:

- Carrots - Bolero, Napoli, Rainbow mix
- Spinach Mix- Bordeaux, Olympia, Space, Tyee
- Swiss Chard: Bright Lights Mix
- Pac Choi - Fuyo Shomi
- Beets- Blankoma, Chioggia & Golden

Crops with multiple varieties listed were sown, harvested, and sold together in a mix.

Figure 1 outlines the crop harvest schedule for Fall 2008. Total harvests were: 80 pounds carrots, 80 pounds pac choi, 76 pounds beets, 64 pounds spinach, and 38 pounds Swiss chard. While spinach did not have the most amount of pounds harvested, it had the longest harvest window, creating steady revenue potential from the end of September through February.

Table 1 shows Blue Gate's income as well as income potential. Marketable revenue includes marketable product they grew but didn't sell along with product they did sell. The majority of the product that was marketable but didn't sell was because the produce was ready outside of their typical

Figure 1. Blue Gate Harvest Schedule

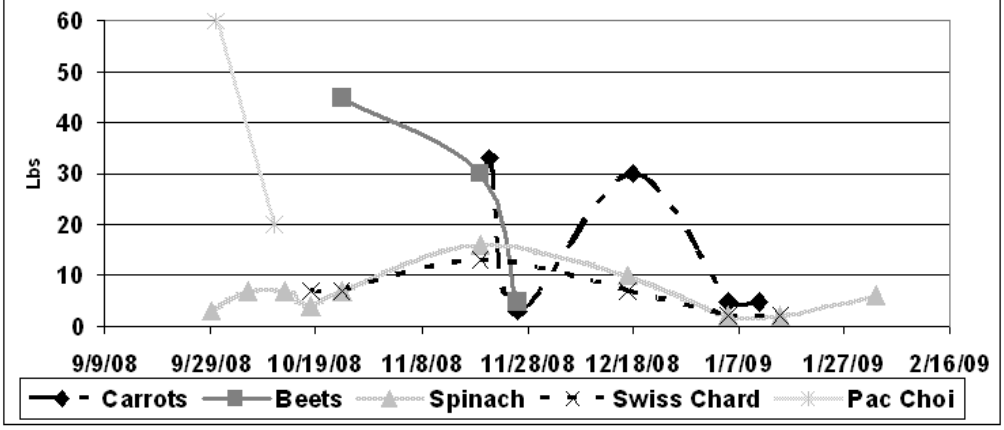

Table 1. Fall 2008 revenue

Crop	Revenue	Marketable Revenue	% Marketable Product Sold	Potential Revenue
Spinach	$540	$640	84%	$840
Swiss Chard	$200	$304	66%	$464
Pac Choi	$140	$160	88%	$380
Carrots	$189	$228	83%	$237
Beets	$36	$240	15%	$240
Total	$1,105	$1,572	70%	$2,161

farmer's market window. Typically Blue Gate Farm offers a fall CSA share. However, they lost their original high tunnel in a tornado in 2008. They didn't have their replacement tunnel up in time to plan for a fall CSA. This would, in other years, provide a more stable market for their product.

Potential revenue includes marketable plus non-marketable product—product that had pest or frost damage. Aphids and rabbits/rodents were their primary pests.

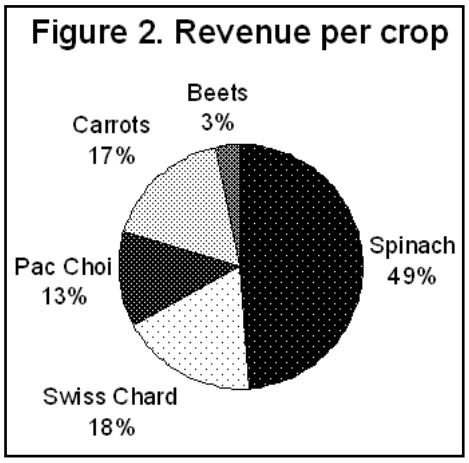

Figure 2 breaks down the percentage of revenue per crop. Spinach was the main bread winner, bringing in roughly half of the income. Swiss chard and pac choi shared a bed, or each had 84 square feet of growing area, while the other crops each had an entire bed, 168 feet of growing space.

The carrot bundles at market were popular sellers. "They were beautiful, and looked like bouquets," commented Jill. The carrots, along with spinach, both sold out at the market. Beets were a tougher sell. Jill noted that "They were small beets. Plus, our regular customers didn't expect us to have fresh beets at that time of the year. They picked those up at another location in the market before making it to our booth."

Jill and Sean spent a total of 101 labor hours in the high tunnel cultivating their fall fare. Breakdown of hours is in Figure 3.

From table 1, it appears that Blue Gate Farm brought in about half of the revenue they could have if they had more aggressively marketed their crops and controlled aphids and rodents. Figure 4 shows the revenue and potential revenue per square foot according to Blue Gate's 2008 market price. Spinach made the most in 2008 per square foot, and comes in second for potential revenue. Swiss Chard came in second for 2008 revenue per square foot, and has the potential to make the most per square foot. However, Jill and Sean didn't always sell out of Swiss Chard at the market.

Adam Montri, Outreach Coordinator for the Michigan State University Student Organic Farm, says that a good goal to shoot for would be $9-$10 revenue per square foot per year. Jill and Sean plan on growing at least three successive crops this year, so the potential

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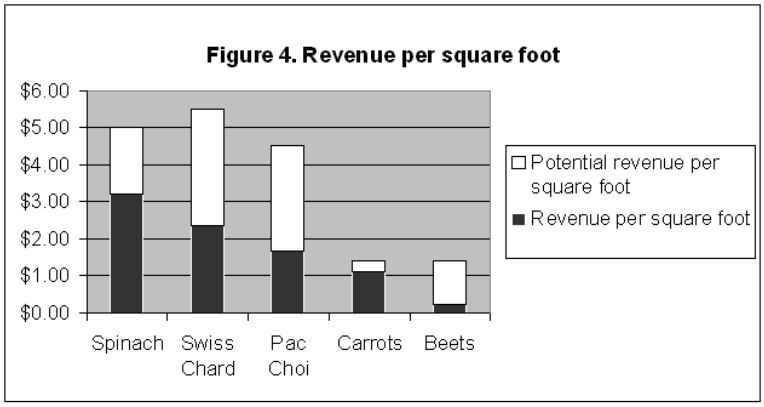

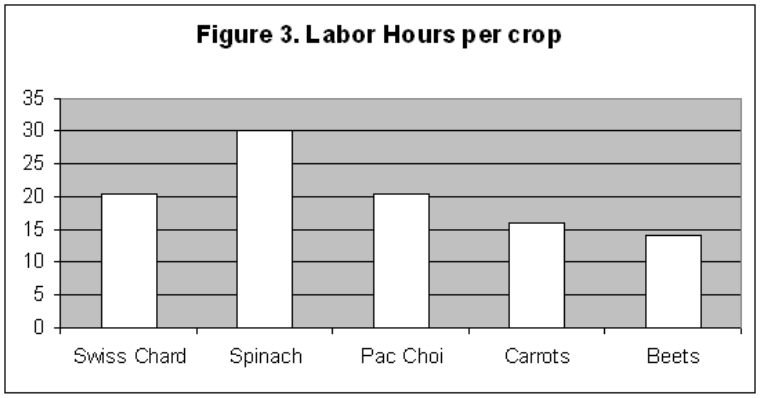

Blue Gate's early season market offerings.

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Table 2. High tunnel construction costs.

Description	Cost	Notes
HT kit from FarmTek	**$3,126.00**	includes shipping
lumber	$618.00	for baseboards (cedar), ribbon boards and end wall framing
steel	$111.00	for bottom pocket of end walls
cement	$110.00	given the conditions left from tornado they choose to cement each rafter foot
tile	$64.00	drainage around high tunnel to carry off shed water and from nearby field
hardware	$145.00	end walls, ribbon board, etc.
storm door	$98.00	placed in end wall
misc	$94.00	vent fan shutter, some electrical
SUB TOTAL	**$4,366.00**	
crew food	$140.00	
TOTAL	**$4,506.00**	

January 2009 salad at Blue Gate Farm.

to meet that goal looks promising.

Table 2 shows the expenses Blue Gate put into building their high tunnel. The kit itself was about 70 percent of the total cost. The manufacturer's recommended lumber additions ran about 14 percent of the total. The remaining 16 percent of the total were electives that Jill and Sean made given their specific site and/or methods. As they lost their last high tunnel in a tornado, they decided to cement each rafter foot.

How long do high tunnels last? Barring a tornado, a typical, galvanized metal hoophouse frame should last at least 30-40 years, says Montri. There is general maintenance upkeep like changing the polyethylene covering every 4-5 years and changing out the lumber as it rots over time if lumber is used for things like the baseboards, hipboards, and the endwalls. The current plastic replacement cost is $485 (for a double layer).

Discussion

Montri notes: "If a farm can make enough income to pay off their high tunnel in four years, they are on target to generate a good profit from the structure." Jill and Sean are on track to meet that goal, and will likely pay off this structure in less time since they plan to use it for a succession of crops over the year.

Before the tornado that ravaged their original hoophouse, Jill and Sean enjoyed four "seasons" over 21 months in a high tunnel that cost a total of $3,579 to construct. Over that time the original tunnel generated enough revenue to recover the entire cost and generate a small profit. They expect the replacement tunnel to serve them just as well, if not better. The replacement tunnel is equipped with larger beds, and Jill and Sean are now more experienced at cultivating in a high tunnel.

"Weather and time were both challenging in 2008," Jill and Sean said. "The tornado loss and the time lost rebuilding caused us the loss of our fall 2008 CSA revenues."

As they look toward the future, this season, like all seasons on a diversified farm, lends suggestions for improvement. "We plan to seal along the baseboards for better air control to keep the cold out. Sealed baseboards should also provide better rabbit/rodent control, and we plan on using more snap traps." Jill and Sean plan to improve their processing and packaging efficiency to reduce man hours.

"If a farm can make enough income to pay off their high tunnel in four years, they are on target to generate a good profit from the structure."

Adam Montri

Jill and Sean have added a second, larger, high tunnel to their operation and are recording high tunnel production data from both tunnels for spring and summer 2009 as part of a cooperators' project for Practical Farmers of Iowa. We will release a year-long crop scheduling and financial report later on this year.

Practical Farmers of Iowa is conducting year-long season extension programming funded by the Ceres Foundation. If you would like to learn more about our season extension work, contact Sally Worley, (515)232-5661, sally@practicalfarmers.org, or visit our website at www.practicalfarmers.org.